

REMARKS

Claims 2, 4, 5, 7 and 14-23 are pending in this application. Claim 23 is cancelled, and claims 2, 4, 7, 15, 17, 20, 21, and 22 are amended herein. No new matter is added.

Claims 2, 4, 15, and 17 are independent.

The Examiner's indication of the allowability of claims 20-22 if rewritten in independent form is noted with appreciation. However, as should be understood from the remarks below, such amendment is not necessary, as claims 2, 4, and 15 (from which claims 20-22 respectively depend) are allowable in view of the applied art.

Claims 2, 4-5, 7, 14-16, and 20-23 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The rejection is respectfully traversed.

The Examiner relies upon MPEP §2173.05(i) in arguing that the negative limitations of claims 2, 4, 15, and 23 render these claims unpatentable by reciting subject matter that is not described in the specification. It is respectfully submitted that, as recited in the MPEP §2173.05(i), "[s]o long as the boundaries of the patent protection sought are set forth definitely, albeit negatively, the claim complies with the requirements of 35 U.S.C. §112." Thus, a negative limitation will not render a claim ambiguous or uncertain.

Further, it is respectfully submitted that the invention recited in pending claims 2, 4-5, 7, 14-16, and 20-22 is disclosed in the originally filed specification. As amended, independent claims 2, 4, and 15 recite "bismuth and antimony are not added to" said alloy composition or plating. Support for the lack of addition of bismuth and antimony is found in the originally filed specification at, for example, 1)

page 7, line 20, through page 8, line 3; 2) page 15, lines 2-4; 3) page 16, lines 16-18, and associated table 2 on page 17; and 4) page 19, lines 3-8, and associated table

3. Each of these examples discloses one or more compositions to which bismuth and antimony are not added.

In particular, the page 7 and 8 text discloses that a bismuth-containing lead free solder is undesirable because such a solder is subject to thermal fatigue. This text discloses two preferred chemical compositions of a lead free solder in accordance with the present invention. The first is a composition having 2.0 to 5.0 mass% of silver, 0.01 to 2.0 mass% of copper, 0.002 to 0.015 mass% of phosphorus, and with the balance of this first composition being tin. The second is a composition having 0.01 to 2.0 mass% of copper, 0.002 to 0.015 mass% of phosphorus, and with the balance of this second composition being tin. Thus, neither bismuth nor antimony is added to the first or the second composition.

Similarly, the disclosure on page 15 teaches a phosphorus-containing, lead free solder having a chemical composition of tin, 3.0 mass% silver, 0.5 mass% copper, and 0.01 mass% phosphorus, and table 2, and the related text on page 16, teaches several compositions consisting of the elements of 1) tin, silver, and copper; 2) tin, silver, copper, and phosphorus; 3) tin and copper; and 4) tin, copper, and phosphorus. Both the page 15 and the table 2 examples teach compositions to which neither antimony nor bismuth is added. Table 3, and the related text on page 19, teaches tin, silver, copper, and phosphorus compositions and tin, copper and phosphorus compositions to which bismuth is added, as well as tin, silver, copper and phosphorus compositions and tin, copper, and phosphorus compositions to which bismuth is not added. Table 3 discloses that antimony is not a constituent of any composition included therein.

Thus, the originally filed specification in at least four sections discloses an alloy composition or plating in which “bismuth and antimony are not added.”

Accordingly, it is respectfully requested that the Examiner reconsider and withdraw the 35 U.S.C. §112, first paragraph, rejection of pending claims 2, 4-5, 7, 14-16, and 20-22.

Claims 2, 4-5, 7, 14-16, and 23 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite. More particularly, the Examiner questions the meaning of the claim phrase “not intentionally added” found in claims 2, 4, 15, and 23. In view of the Examiner’s noted concerns, claims 2, 4, and 15 have been amended to remove the term “intentionally”, and claim 23 has been cancelled. Accordingly, it is respectfully requested that the Examiner reconsider and withdraw the rejection under 35 U.S.C. 112, second paragraph.

Claims 2, 14-17, and 19 stand rejected under 35 U.S.C. §102(b) as being anticipated by Matsuzaki (JP-03255637 A). Claims 4-5, 7, and 18 stand rejected under 35 U.S.C. §103(a) as being obvious over Kenji et al. in view of Matsuzaki. The rejections are respectfully traversed.

As discussed in the previous response, Matsuzaki describes a solder for die bonding that requires antimony, silver, copper, and one or both of tin and lead (see abstract). The antimony is an “essential” component of Matsuzaki’s solder (see page 3, left column, lines 11-12). Hence, Matsuzaki’s solder must contain antimony. The Kenji reference discloses a connection lead that includes a conductor strip and a plating formed of a lead-free solder including mainly tin.

It should be noted that the preamble of independent claim 17 has been amended to remove “essentially,” which the Examiner argues requires the claim to be construed as a “comprising” claim. Though applicants disagree with the

Examiner's position regarding such a construction, claim 17 is amended herein. As amended, claim 17 recites "[a]n alloy composition for a lead free solder used to connect a connection lead to a material, consisting of: ... phosphorus; ... silver; ... copper; and tin." Hence, the alloy composition of claim 17 does not include antimony, but rather consists only of phosphorus, silver, copper, and tin. Thus, independent claim 17 is novel and unobvious in view of the applied art, as the Matsuzaki reference requires antimony.

The remaining independent claims (claims 2, 4, and 15) each require that antimony not be added, as discussed above. Also discussed above, antimony is an essential component of the Matsuzaki reference (i.e., antimony is added) under which each of claims 2, 4, and 15 is rejected. Thus, independent claims 2, 4, and 15, as well as their dependencies (claims 5, 7, 14, 16, 18, and 19), are likewise novel and unobvious in view of the applied prior art.

Accordingly, in view of the above, it is respectfully requested that the Examiner reconsider and withdraw the prior art rejections of claims 2, 4, 5, 7, and 14-19.

In summation, support for the pending claims is found in the originally filed specification, the pending claims are definite, and the applied art neither teaches nor suggests the pending claims. In view of the foregoing, it is respectfully submitted that the application is in condition for allowance and an early indication of the same is courteously solicited. The Examiner is respectfully requested to contact the undersigned by telephone at the below listed local telephone number, in order to expedite resolution of any remaining issues and further to expedite passage of the application to issue, if any further comments, questions, or suggestions arise in connection with the application.

Docket No. 3008-0028
File No. 521.41457X00
Client No. PHCF-01094

To the extent necessary, applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage of fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account No. 01-2135 (Case No. 521.41457X00) and please credit any excess fees to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP



Sterling W. Chandler
Registration No. 51,370

1300 North Seventeenth Street
Suite 1800
Arlington, VA 22209
Tel.: 703-312-6600
Fax.: 703-312-6666

SWC/slk